SEE Bulletin

NASA's Space Environments and Effects Program January 2003

# NASCAP-2K is Now Available!

The latest in spacecraft charging analysis tools, NASCAP-2K v. 1.1, is now available from the SEE Program. Funded in cooperation with the Air Force Research Lab (AFRL) at Hanscom AFB, and developed by Science Applications International Corporation (SAIC) in San Diego, the code offers the very latest in charging algorithms, object definition and modern graphical user interfaces.

NASCAP-2K will replace 3-D spacecraft charging codes for all environments: Version 1.1 replaces NASCAP/GEO and is ready for distribution. Version 2.0, scheduled for release in the fall of 2003, will add the LEO environment while replacing NASCAP-LEO and the Air Force's DynaPAC charging algorithms. The LEO environment beta code is included in NASCAP-2K v. 1.1. Auroral charging, also to be included in version 2.0, will replace the POLAR code. Once version 2.0 comes out, a single, comprehensive spacecraft charging analysis code will have replaced the three separate, original NASCAP codes.

NASCAP-2K v. 1.1 offers significant improvement over the original NASCAP/GEO code by using modern programming languages and computing platforms:

- Written in Java, Java3D and C++ for Win32 platforms;
- Compatible with LINUX and UNIX platforms;
- Gives the user the opportunity to build objects in a modern, graphical environment, using the new Object Toolkit (Otk);
- Provides a modern graphical user interface to define the type of problem, specify parameters, build and execute "script" and visualize and analyze results;
- Includes a new GridTool which constructs nested, cubic grids;
- Uses the Boundary Element Method (BEM) to allow the user to model currents and potentials in a single step, anticipating changes in electric fields;
- And builds upon the Air Force's DynaPAC spacecraft charging algorithms (developed for AFRL to solve complex static and dynamic spacecraft/plasma interaction problems)

NASCAP-2K is not just an update. It is a comprehensive revision to the original NASCAP codes and is one of the most powerful analysis tools available for spacecraft charging mitigation.

NASCAP-2K is available only to US citizens. To request a copy, please visit the SEE Program's website at http://see.msfc.nasa.gov, under the "What's Hot" banner.

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## Satellite Contamination and Materials Outgassing Knowledgebase Update

The SEE Program has been diligently working to restore access to the Satellite Contamination and Materials Outgassing Knowledgebase. Since this product is export controlled, the on-line database had to be taken off-line while its web security was evaluated. Because web servers cannot be 100% hacker-proofed, we now believe the best course of action is to convert from an on-line database to a stand-alone file that can be sent directly to the contamination community on CD-ROM or DVD. This process is almost finished and we expect to have the new file ready by early February. Those who previously had access to the Knowledgebase will automatically be sent the new disk without any additional paperwork from you. New users may now request the disk from the SEE Program's website at http://see.msfc.nasa.gov; however, please remember that no action will be taken by us until the new disk is ready for distribution.

We apologize for the inconvenience this situation has caused. Your Knowledgebase needs are important to us and we will do everything we can to restore access to the Knowledgebase in the shortest amount of time possible.

## Introducing the *Charge Collector*…

The *Charge Collector* is a compilation of spacecraft charging-related products offered by the SEE Program. Presented on a CD-ROM disk, you will find some of the very latest spacecraft charging information from experimental testing of spacecraft cables, materials characterizations, coating development, updated/new design guidelines and other useful SEE Program products - all dedicated to the mitigation of spacecraft charging. Each folder represents a separate task that was funded by the SEE Program. As new products are received, the CD will be updated.

Version 1.0 includes:

- New materials properties data applicable to spacecraft charging;
- New, never-before-achieved spacecraft cable charging data;
- Data on material coating conductivity
- New LEO charging guidelines (available in Spring of 2003)
- Various publications related to spacecraft charging.

Additional products and new data on a variety of subjects relating to spacecraft charging will continuously be added. The SEE Program will advertise when new versions become available.

The *Charge Collector* is available only to US citizens. Forms requesting the *Charge Collector* may be found on the SEE Program website at http://see.msfc.nasa.gov under the "What's Hot" category.

## LRAD L2 Charged Particle Environment Model

The LRAD (L2 radiation) model is an engineering tool for estimating flux statistics and mission integrated fluence of low energy charged particles from 10 eV through 1 MeV in the Earth's distant magnetotail. Based on data from the Geotail and IMP-8 satellites, a original version of the model was developed by Jacobs Sverdrup to provide a low energy plasma environment (< 10 keV) definition of the L2 region for the James Webb Space Telescope program. The SEE Program funded upgrade of the software includes a graphical user interface and incorporation of energetic particle observations to extend the energy range to 1 MeV. Solar wind, magnetosheath, and magnetotail environments included in the model are sampled in halo orbits about L2, and a capability for a user provided ephemeris is included as well. Output from the model is used to determine radiation environments for assessment of surface degradation and total dose effects in thin materials (sun shields, coatings, solar sails) in the L2 plasma environment.

*(Please check the SEE website in the coming months)*

# 8th Spacecraft Charging Technology Conference

October 20-24, 2003
Huntsville, Alabama, USA

Hosted By:

NASA's Space Environments and Effects (SEE) Program

## FIRST CALL FOR PAPERS

Technical papers and poster presentations are sought for the 8th Spacecraft Charging Technology Conference. This conference seeks to examine various mitigation techniques in the areas of:

- *Models & Computer Simulations*
- *On-Orbit Investigations*
- *Plasma Propulsion & Tethers*
- *Ground Testing Techniques*
- *Environment Specification*
- *Materials Characterizations*

Abstracts Due: June 27, 2003
Notification of Acceptance By: July 25, 2003

**Registration is limited.**

For more information on paper submission, registration and other conference specifics, please see: http://see.msfc.nasa.gov/sctc
Or contact: Jody Minor at: 256-544-4041 or jody.minor@msfc.nasa.gov

Co-Sponsored by NASA, US Air Force Research Lab (AFRL)
and the European Space Agency's (ESA) ESTEC Division.

## Upcoming Events

National Space and Missle Materials Symposium, San Diego, CA in June 2003

IEEE Nuclear and Space Radiation Effects Conference, Monterey, CA, July 21-25, 2003

8th Spacecraft Charging Technology Conference, Huntsville, AL, October 20-24, 2003

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## In The Next Issue:

Update on Living With A Star Space Environments Testbed Contracts (SET)

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